RISE and FALL of big SMALL PELAGIC FISHERIES: the HUMAN DIMENSION

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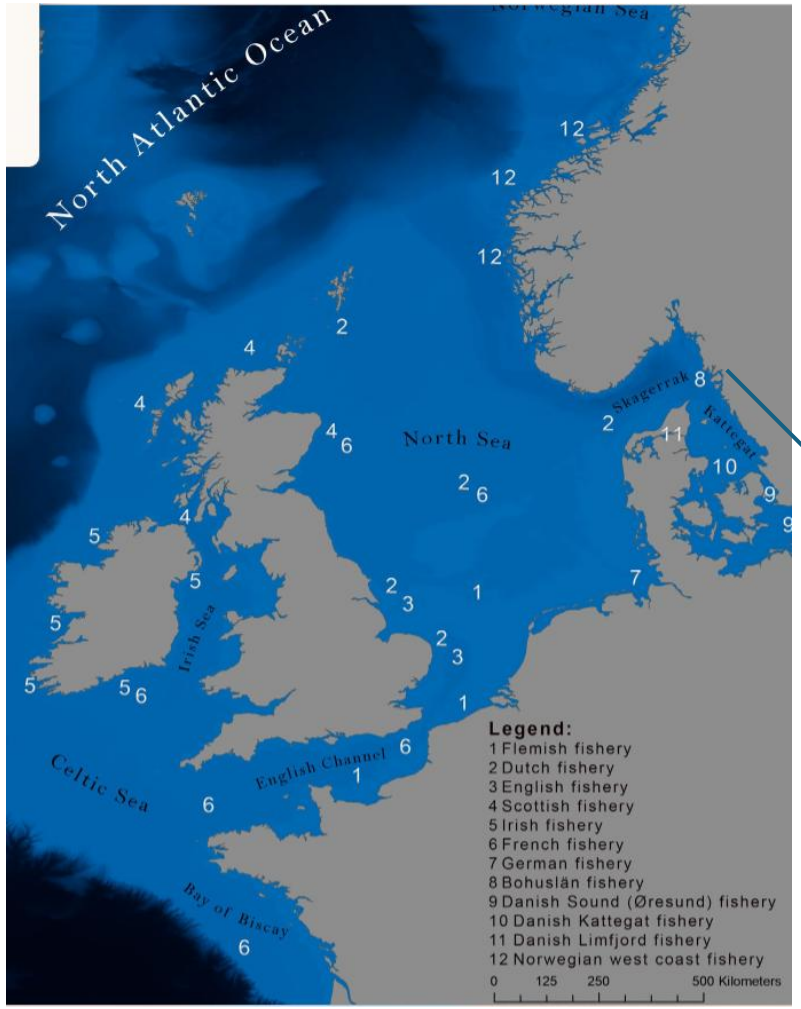
Order-of-magnitude fluctuations of SPF have consequences on land, where families, enterprises, communities and even entire nations depend on the resource.

Impact of boom and bust fisheries on fishing communities.

Cycle: From small village to prosperous fishing centre to decline and then search for an alternative.

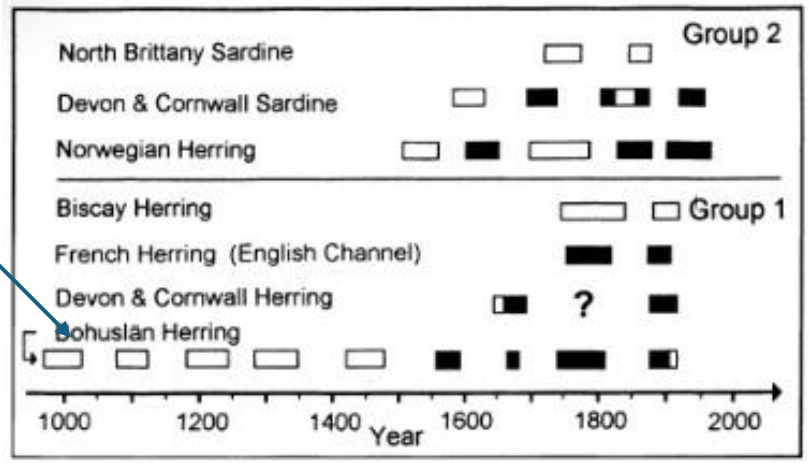
Target Species	Fishing Community	Country
Hering	Bohuslän Coast	Norway, Sweden, Denmark
Sardine	Monterey	USA
Hering	Siglofjordur	Iceland
Anchovy	Chimbote	Peru

1. BOHUSLÄN COAST



Bohuslän Fishery

Bohuslän Periods



1 end of 10th century – early 11th century;
2 end of 11th century – early 12th century;
3 end of 12th century – mid 13th century;
4 end of 13th century – mid 14th century;
5 mid 15th century;
6 1556–1590;
7 1660–1680;
8 1747–1809;
9 1877–1906.

Bohuslän coast panorama 1795, with oil refineries and smoking houses

Products

- Salted hering (European-wide distribution, catholic fasting periods)
- Train oil
- Smoked hering

Resources

- Fishing expertise, boats, equipment often from far away and other countries.

1787

- 338 salting houses, 429 oil refineries, 358 large beach seines, 2100 boats.
- More than 25,000 people activ in fishery (7,500 fishermen, 1,500 sailors, 8,000 labourers in oil production, 8,000 labourers in salting
- Catches: many years with 100 000-200 000 mt.

Hering Smoke house, 1799

PEOPLE

During hering periods

Many immigrants
Labourers from agricultural background.
Comparatively good wages.
Accumulation of wealth, 60 miles of houses along coast.

Negative aspects

Excessive drinking, prostitution, lot of criminality, fights, extra surgeons sent.

End of periods

Disaster, complete break-down of infrastructure
Almost total loss of population, only ruins left

Present situation

Touristical hot spot.

2. SIGLOFJORDUR

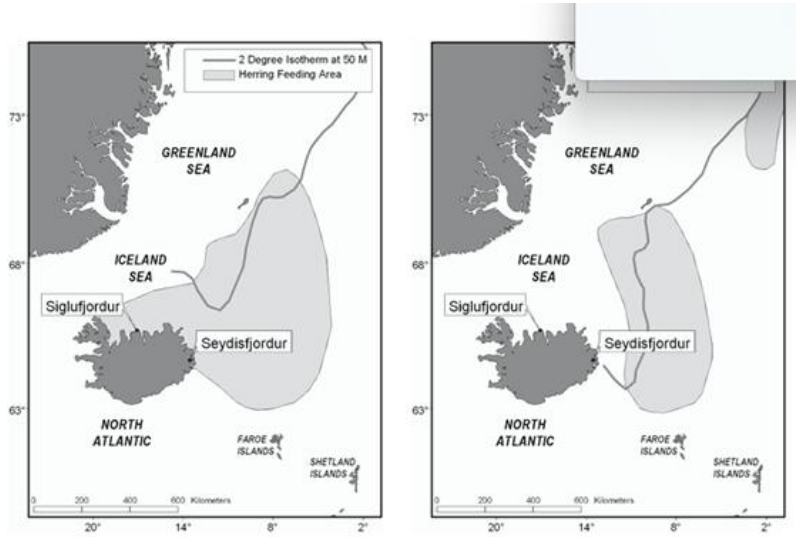


FIG. 1. Iceland and vicinity, showing the "traditional" feeding area of Norwegian spring-spawning herring (left), and their feeding area during the colder conditions of 1965–66 (right). By 1968 this stock was no longer found in Icelandic waters. Two important "herring towns" and the typical location of the 2°C isotherm at 50 m depth are marked as well. Maps by Cliff Brown, after Vilhjálmsson, 1997.

Traditional 1965-66

Feeding Area

Siglufjordur herring landings

- Golden years: 1930s-1940s
- Declining catches: 1950s-1960s
- Collapse: 1968

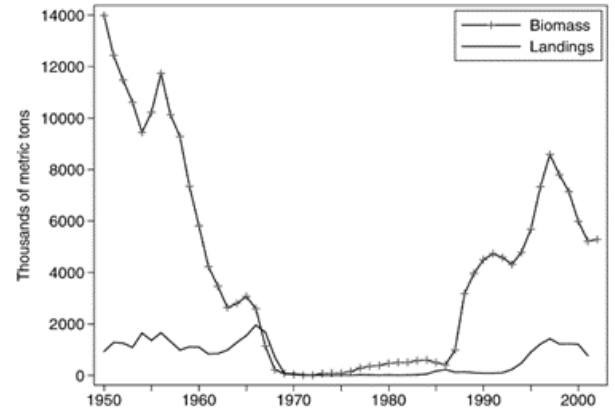


FIG. 2. Total spawning stock biomass and landings of Norwegian spring-spawning herring, 1950–2000. Data source: ICES, 2001, updated.

Spawning stock biomass Norwegian Spring Spawning Hering

- Total Icelandic catches over 200 000 mt several times 1930s and 1940s.
- Hering fishery pushed Iceland from poverty to affluence.
- Contributed to economic and then political independence.

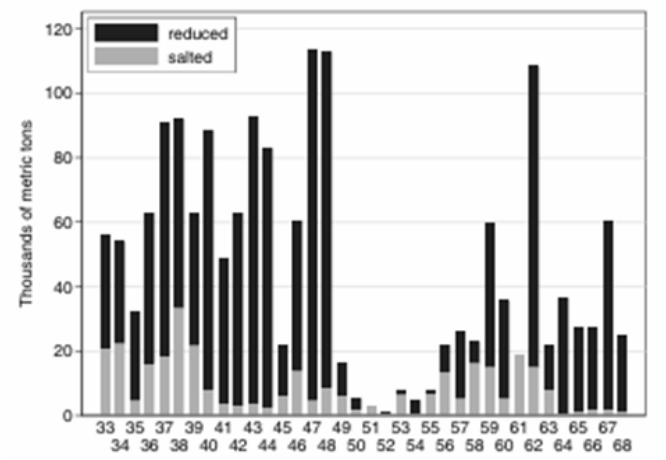


FIG. 4. Tons of herring processed by salting or reduction in Siglufjörður, 1933–68. Salting data estimated from Sigurðsson (1990). Reduction figures for 1951 and 1961 are unknown; those for other years are estimated from various sources.

Tons of reduced (black) and salted (grey) herring

Population growth

FIG. 8. Winter (non-seasonal) population of Siglufjörður, 1889–2000. Data source: Statistics Iceland 1997, 2002

Permanent population increase 1890 – 1949: 100 – 3,100

During fishing season: 13,000 in hay days

After 1944: up to 35% of Icelandic export earnings from herring. 20% of world herring catches from Iceland.

Siglufjordur became economic center and fifth-largest town in Iceland in 1950s and 1960s:

Hering Capital of the World

400 fishing vessels, 5 meal factories, 25 salting stations.

Klondyke of Atlantic.

Poor farm labourers and young people from country sites migrated to Siglufjordur.

Young Icelandic women (Herring Girls) ignored warnings of sin, taking arduous, but well-paying jobs, processing and salting the catch.

Hard labour provided many young people from poor backgrounds with savings they used for housing, education and new businesses.

Herring Girls

COLLAPSE and PRESENT SITUATION

1968: no more herring

Crash due to overfishing in the 50s and 60s and adverse oceanographic conditions in late 1960s.

Hering collapse was national shock for Iceland:

- unemployment increased around Iceland
- net out-migration jumped in 1969-70 to highest levels since 1887

Early 1980s: Siglufjordur population 1,000.

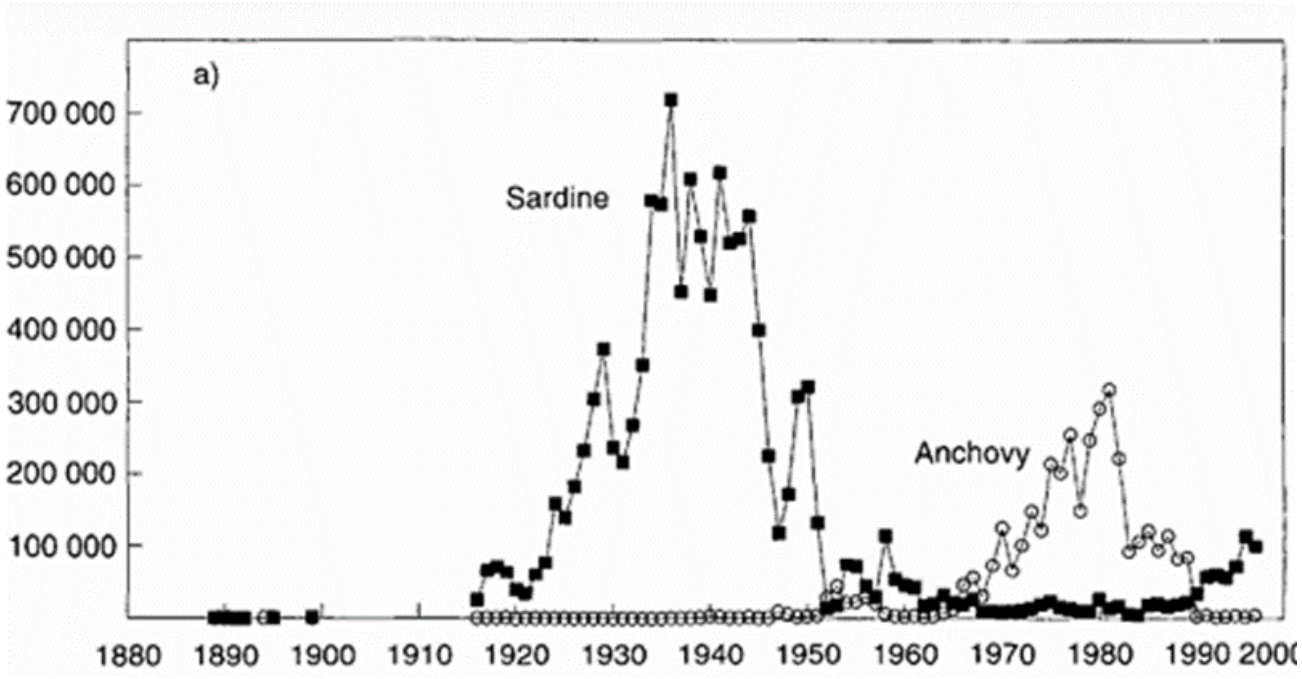
Fishing still remains town's main livelihood, but on much reduced scale and for other species.

Tourism envisaged as possibility for future development, but town too remote.

1946

2003

3. MONTEREY



Sardine catches:

- Golden years: 1930s – 1940s
- Decline: 1940s -1950s
- Collapse: 1968

PEOPLE

Fishermen: Immigrants from Italy, Portugal, Yugoslavia, Scandinavia, Japan.
Plant workers: additionally Mexicans, Chinese
More than 100 cannery and reduction plants between San Diego and San Francisco, 376 vessels, thousands of workers.
At first, industry had no regulations of hours and shifts. Work in canneries was often long, cold, smelly and unsafe.

POLITICAL IMPLICATIONS

Strong conflict between:

State of California scientists (California Department of Fish and Game, State institution): to avoid overfishing.

Federal scientists (U.S. Fish and Wildlife Service, national institution), agency to develop U.S. commercial fisheries: other reasons than fishing responsible for decline.

Opinion at first half of 20th century often that oceans are inexhaustible. Nature, not fishing causes stock declines.

Famous joint paper by two eminent scientists: Frances Clark (State) and John Marr (Federal) presented the conflicting arguments drawing different conclusions based on same data.

1957 CalCOFI Committee founded.

DECLINE and PRESENT SITUATION

1968: 80 years after sardine fishery had started, it was gone.

Fishermen targeted different species, went to other fields, other countries.

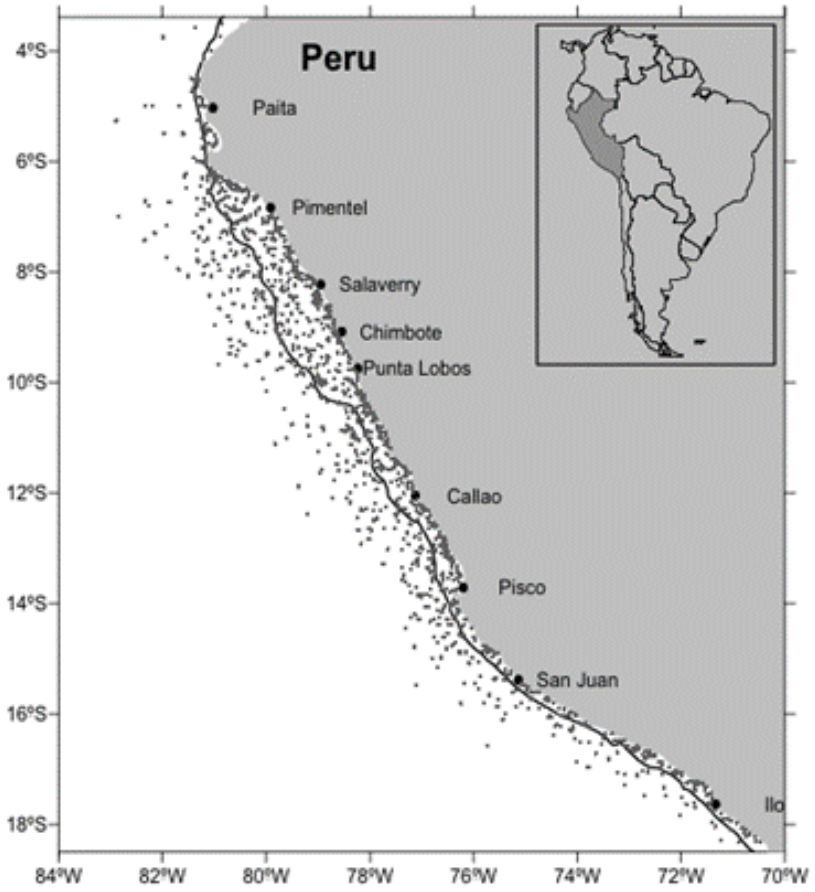
Boats and machinery were sold, particularly to Peru, Chile, South Africa.

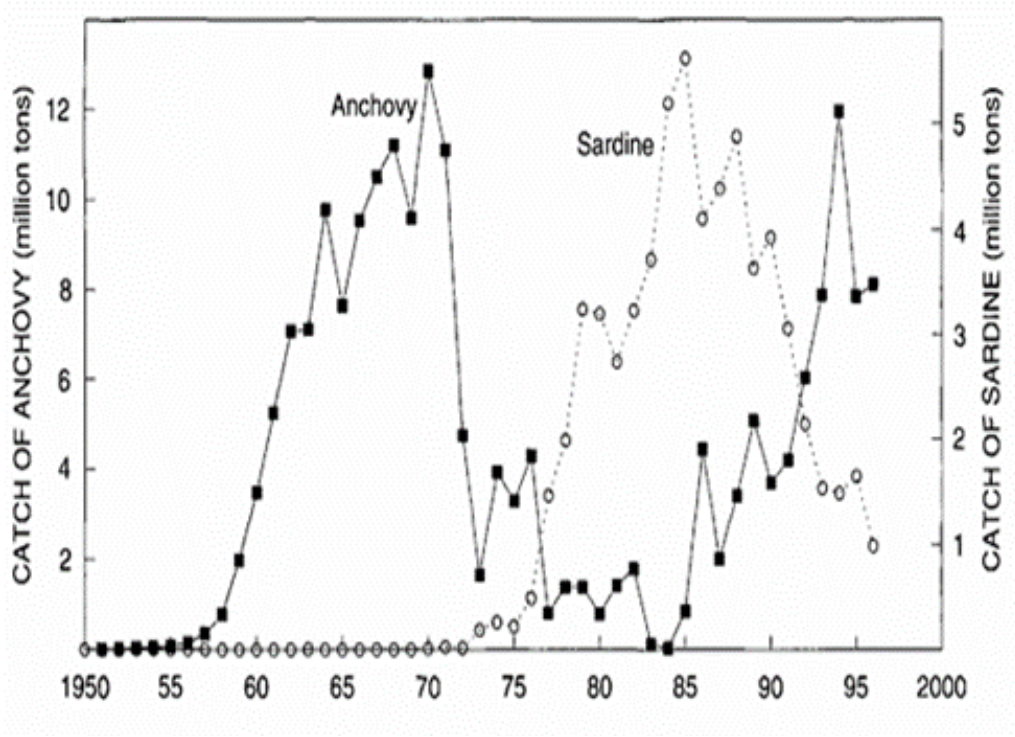
Result: unemployment, industrial decay .

Cannery Row at old times

1970s revival of Cannery Row. Transformed from a street of burned and decrepit canneries to Number One tourist destination of California’s Central Coast.

4. CHIMBOTE





Golden Years: 1960 – 1971

Collapse 1971/72

1963 – 1972: largest fishery port of world: Anchovy world capital

FISHERIES INDUSTRY

Fish meal industry enormously influenced political and economic development of Peru.

At peak: - 25,000 people employed, 1,700 bolicheras, 150 fish meal and oil factories

Fish meal production: from 31 mt in 1956 to 1,922 mt in 1968

Number 1 producer of foreign Peruvian exchange.

California equipment (vessels, meal factories) cheaply sold to Peru

POPULATION CHIMBOTE

Population: from 4,000 in 1940 to 60,000 in 1961

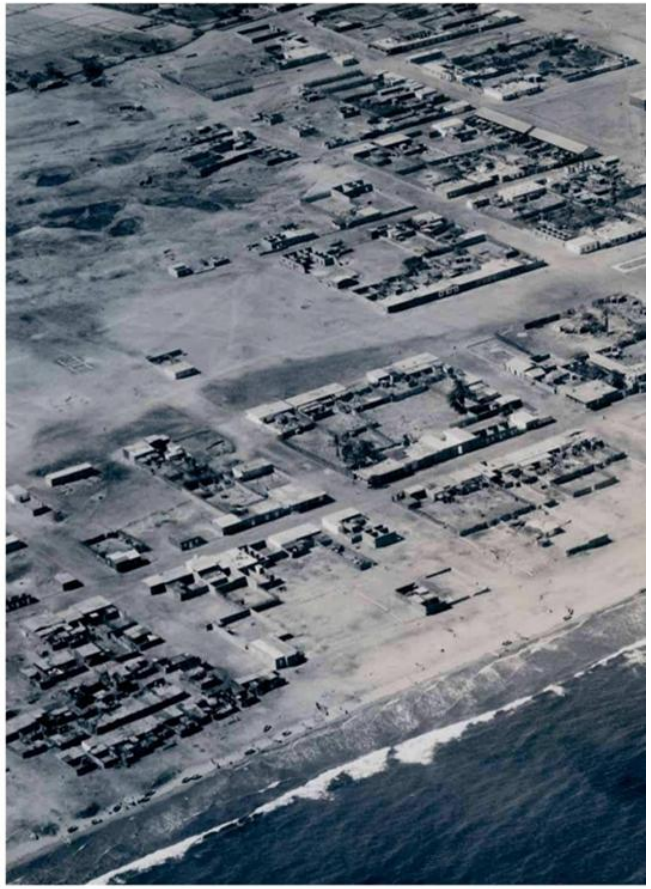
Migrants from Andes and arid northern Peru. Very poor, very different culture, not Spanish-speaking, no fisheries experience.

Fishermen extremely well paid. Spent most of their income immediately. Excessive drinking and womanizing. Factory workers poorly paid.

Many new jobs for middle-class professionals. Lawyers, engineers, boat skippers, factory owners. Some clever people became millionaires overnight.

Fish meal magnate Luis Banchero Rossi murdered under mysterious circumstances in 1972.

By 1970, over 70% of population lived in slums: Chimbote had become a metropolis of reed mats and adobe houses. Communities without running water, electricity or sewerage. High rates of infant mortality, malnutrition, disease. Massive atmospheric, aquatic and terrestrial pollution.



Aerial view of Chimbote, 1929)

CRASH

Peruvian anchoveta fishery crashed in 1971/72 as a combined result of a regime shift (beginning in 1968), dramatic overfishing and the 1972 El Nino.

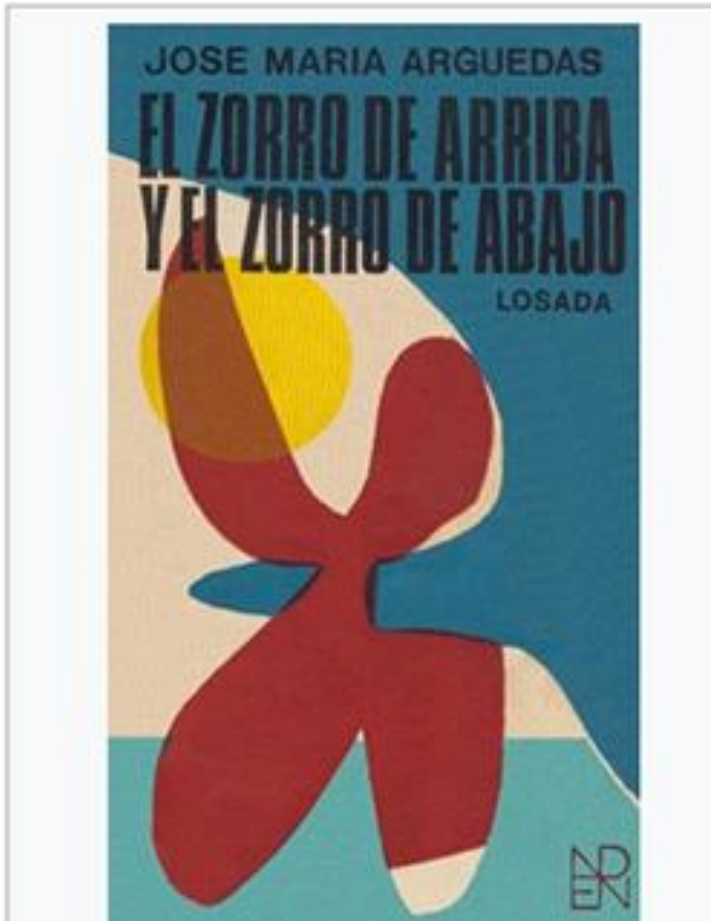
- Immense political and economic disaster for Peru.
- Repercussions throughout international commodity markets.
- Price for farmed chickens and pigs increased world-wide.

In 1973, the “left wing” military government of Peru nationalized the fish meal industry and took over its debts. New state company “Pesca-Peru”. Factory owners and fishermen highly angered. In 1975, when Gen. Bermudez had ousted Gen. Velasco, the fishing fleet was reprivatized.

Fisheries minister General Tantalean

“There was no other way.”

The Fox From Up Above and the Fox From Down Below



Life of Chimbotanos vividly and drastically described in novel of Jose Maria Arguedas (The fox from up above and the fox from down below). Suicided before finishing).

Insightful critique of problems of boom-town Chimbote: social inequality, abuse of industrialists, controversial role of foreign capital.

What was left from the fish meal industry in Chimbote: gross amounts of pollution, hundreds of thousands of workers and their families living in precarious conditions in slums (pueblos Jovenes) and an ailing ecosystem.

During the 1980s, when the sardine stock sprang up, Chimbote transitioned to a canning industry and, when the anchovy returned during the 1990s, the meal industry became highly important again.

Scenario

Gerald Paulik, a fisheries scientist from U. Washington, Seattle, described the events which led to anchoveta crash in detail: heavy fishing pressure, adverse oceanographic conditions, recruitment failure, low catches, rising fish meal prices, concentrating of residual population in narrow band along coast, warning of scientists, continuation of fishing because entrpreneurs have to pay loans and operating expenses.

This was published on 1st January 1971, **before crash**. Amazing visionary. Suicided in 1972.

COMPARISON and CONCLUSIONS

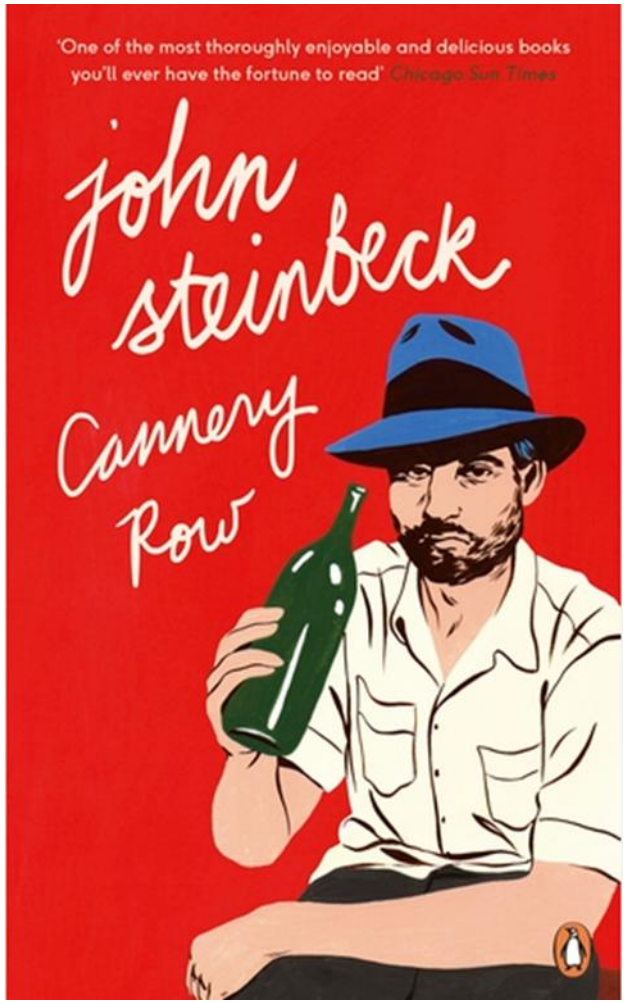
- Inspite of medieval or modern epoches, different regions, developed or developing milieus, divers historical, political, socio-economic backgrounds and differing types of fisheries: many commonalities.

- 20th century: excess in fishing and processing capacity; due to sonar, power block, nylon nets

- Disastrous final outcomes: unemployment and insolvency

- National tragedies for Iceland, Sweden, Peru.

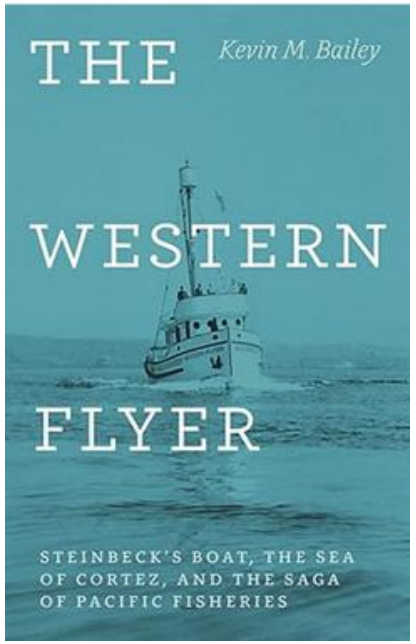
- Some winners: enterpreneurs, Icelandic labourers



The collapsed canning and fish meal industry of Monterey is immortalized by Nobel Prize winner John Steinbeck's novel "Cannery Row" (1945).

Disappointing with respect to insights into sardine fishery and industry, but highlights a man who made important statements about drivers of SPF populations and fishery, and most of you do not even know him: Ed Ricketts.

JOHN STEINBECK – ED RICKETTS



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Best friend of John Steinbeck. Both organized research cruise to Sea of Cortez 1940 (published). Ricketts published famous textbook "Between Pacific Tides", (1939) still used in university courses.

First scientist to provide explanation why the sardine disappeared. 1947 newspaper article in "Monterey Peninsula Herald" predicted collapse of sardine linking it to warm water years. Same conclusion reached by an army of scientists at CalCOFI in 1955. Recommended reduced catches. One of the first to apply ecology to fisheries science.

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